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ABSTRACT

The proliferation of microcomputers in early childhood education has raised concerns about the computer's effects on the preschool curriculum. Of particular concern is the possibility that children will interact with the computer to the exclusion of other important activities. To examine this issue, a two-study project investigated children's activity choices in a 1-hour free-play period. Gender, competence, and free-play areas were the independent variables. The first study involved a class of 4-year-old children at a university-based nursery school; a class of 4-year-olds attending a university day care center participated in the second study. A microcomputer and age-appropriate software were placed in each classroom according to the following schedule of treatment weeks: baseline, computer-noninteractive (omitted in the second study), computer-interactive, and computer-interactive/teacher-interactive. The presence of the microcomputer intitially disrupted children's free-play choices. After several weeks, children's free-play patterns returned to baseline levels. In the first study, it was found that girls spent more time at the computer than did boys; however, no significant sex differences were found in the second study. In both, children judged to have high and medium levels of competence spent equal amounts of time at the computer. (Author/RH)

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Competence, Gender and Preschooler's Free Play Choices When a Microcomputer is Present in the Classroom

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Abstract

The proliferation of microcomputers in early childhood education has raised concerns about its effects on preschool curriculum, particularly that the children will interact with the computer to the exclusion of other important activities. This two-study project examined children's activity choices in a 1-hour free-play period. Sex, competence, and free-play areas were the independent variables. Study 1 involved a 4-year-old class at a university-based nursery school; the 4-year-old class of a university day care center was utilized for Study 2. A microcomputer with age-appropriate software was placed in each classroom with the following treatment weeks: baseline, computer-noninteractive (omitted in the second study), computer-interactive, and computer-interactive/teacher-interactive. The presence of the microcomputer initially disrupted children's free-play choices. After several weeks, children's free-play patterns returned to baseline levels. In Study 1, girls spent more time at the computer than boys; there were no significant sex differences in Study 2. In both studies, high and medium competency children spent equal amounts of time at the computer.

Competence, Gender and Preschooler's Free-Play Choices When a Microcomputer is Present in the Classroom

There is a paucity of systematic research examining the effects of microcomputers on children's social development. However, a number of anecdotal, observational, and pilot studies have sought to address social interaction patterns occurring around the computer (Borgh & Dickson, 1983; Jewson, Sheingold, Gearhardt, & Berger, 1982). These researchers investigated the important issue of whether computers change social interaction. While many of these studies revealed increased social interactions occurring around the computer (Borgh & Dickson, 1983; Church & Wright, 1983; Sheingold, 1981), there remains an equally important issue: what happens to the remainder of the preschool curriculum once the microcomputer is inserted? Barnes and Hill (1983) questioned whether young children would interact with computers to the exclusion of other important objects in the environment. Will the presence of a microcomputer overshadow the other designated learning centers? How attractive is the computer in comparision to other play areas? Is interest in the computer a temporary phenomenon?

Sheingold (1983) warned that the computer should not replace other learning centers: early childhood educators should consider the microcomputer one of the many learning tools children might use. Sheingold (1981) also noted that while computers are physically present, there seems to be a lack of integration with the existing curriculum;

there is a need to integrate the computer with other learning centers in the classroom. No research to date has examined the attractiveness of the microcomputer in comparison to other play areas in a preschool classroom. Yet observations at the Capital Children's Museum and Sesame Place may shed light on this issue. The museum and the amusement park feature a variety of exhibits, including computers. Not only have children demonstrated enthusiasm and interest toward the computers but have spent considerable time at these exhibits (Wredge, 1982). Similarly, White (1983) reported that children attending a similar museum skipped the other exhibits and concentrated heavily on computers and video-games. Such reports indicate the allurement and attractiveness of the computer.

A second issue addresses observations that computer-involvement is becoming a predominantly male activity. Numerous researchers have reported greater male computer use in elementary and secondary schools (Anderson, Welch, & Harris, 1984; Lockheed & Frakt, 1984; Sanders, 1984). Jewson et al. (1982) found that among children ages 8, 9, 11, and 12, girls were never identified as computer experts. However, it has been reported (Reed, 1983) that such differences do not exist at the preschool level. If this is true, then replication of those findings would serve to underline the importance of exposing young children to computers before girls are socialized away (O'Leary, 1977).

A final issue revolves around a recent cross-sectional study among elementary schools which revealed that teachers frequently report the emergence of classroom experts (Sheingold, 1981). Such findings raise

the question of what characteristics predict becoming a computer "expert." It seems logical that the concept of competency (Anderson & Messick, 1974; Baumrind, 1973; Emmerich, 1977; Schaefer, 1971; White, 1972) would be closely related.

As part of the Children and Technology Project (CAT) at UNC-Greensboro, the following specific research questions were addressed in two separate studies:

1. How are free-play choices affected by the introduction of the computer. Specifically,
   (a) Which free-play choice areas (art, blocks, dramatic play, etc.) decline with the introduction of the computer?
   (b) Which choices appear unaffected by the introduction of the computer?
   (c) Is interest in the computer a temporary phenomenon; that is, do children return to baseline free-play choices over time?
2. Is there a sex difference in preference for the computer?
3. Are competent children more likely to choose the computer?

Method

Subjects

Subjects for Study 1 were the eight boys and four girls enrolled in the 4-year-old class at the University Nursery School. The children,

from white, well-educated, two-parent families, ranged in age from 4 years, 2 months to 5 years (average age = 4.5 years). One male in the classroom who was diagnosed as aphasic was not included in the analyses, leaving 11 subjects.

For Study 2, the 4-year-old class of the University day care center was utilized. Again, the 12 girls and 10 boys were mostly from well-educated, two-parent families and ranged from 3 years, 11 months to 5 years, 4 months (average age = 4.7 years). Twenty of the children were white and two black. One boy and one girl who were absent during the week of baseline were not included in the analyses, leaving a total of 20 subjects.

Competence Measure

Two teachers from each center completed the Classroom Behavior Inventory (Schaefer, Edgerton, & Aaronson, 1978) for each child. This instrument consists of 42 items, each of which is rated on a scale of 1 ("not at all like") to 5 ("very much like"). Only the lead teacher's scores were used for analysis. The scores ranged from 127 to 174 in Study 1 and from 97 to 175 in Study 2. All children in both settings fell into either medium or high competency groups.

Procedure

Prior to the beginning of the treatment phases, biographical data was collected, a family questionnaire was administered to assess family computer purchases, and the Classroom Behavior Inventory completed.

The children in both settings were observed during a 1-hour free-play period on Tuesdays through Fridays. In Study 1, children selected activities from one of six areas: art, block, dramatic play, entrance area, manipulative toys, and media (books). Children in Study 2 selected from five similar areas: art, concept, dramatic play, quiet, and media (books and telephone).

The children were observed from a week of baseline followed by two (Study 2) or three (Study 1) weeks with the computer added to the media area. In Study 1, the weekly treatment phases were as follows:

1. **Baseline:** Classroom remained basically unchanged except the the floor was taped off to designate play areas and the children were given numbered vests to wear; a female observer was present in the media area, but she did not interact with the children.
2. **Computer Present/Noninteractive:** An Apple IIe with disk drive and color monitor was placed on a low table with several chairs in the media area. A Sticky Bear ABC's demo diskette caused the computer to function like a television: there was continual action on the screen and use of the keyboard had no effect on the software. The female observer did not interact with the children who came to the computer.
3. **Computer Present/Interactive:** Sticky Bear numbers and ABC's software were used. With the ABC's software, any letter-key touched operated the software; with Sticky Bear Numbers, any

number-key worked the software. The space bar also worked for both software packages. The female observer did not interact with the children.

4. **Computer Present/Interactive/Teacher Interactive:** This condition was identical to phase 3 except that the female observer interacted with the children, helped them use the new software added this week (Sticky Bear Shapes and Sticky Bear Opposites), and taught the children how to change software.

Study 2 had the same design except that Week 2 (Computer Present/ Noninteractive) was omitted.

One trained observer recorded the free-play choice measure. During the hour free-play period, the observer sat in an observation booth adjacent to the classroom. At the beginning of the hour and at every 5-minute interval thereafter, the observer recorded the location of each child in the room. Tape was placed on the floor of the classroom to assist the observer in delineating the play areas. In addition, the children were given vests with a large number and their first name printed on the front and back. This further assisted the observer in quickly identifying and locating children. The observer took 30 seconds to scan the room and quickly recorded each child's number in the appropriate play area. There were 13 such recordings for the free-play period each day. Because of absences and children being out of the room during some observation intervals, the actual number of times each child was observed varied; therefore, the data were converted to percentages.

Results

Three main analyses were performed. First, an area by treatment week repeated measures analysis of variance was performed to determine if the children's free-play choices were affected by the insertion of the computer. Simple main effects for each play area and Tukey's multiple comparison procedure for each of the simple main effects were computed. Secondly, a sex by treatment week mixed, repeated measures analysis was performed on the percentage of time in the computer area. Finally, a competence by treatment week mixed, repeated measures analysis was done on the percentage of time in the computer area. To control for experiment-wise error, alpha for each of the three main analyses was set at .02.

Free-Play Choices

In both settings there were significant ($p = .0001$) effects for free-play choice area and the interaction of free-play area with treatment phases (see Tables 1 and 2 and Figures 1 and 2). Since these studies were concerned with differences from baseline phase to computer phase (the interaction effect), each free-play area was was examined separately (simple main effects).

In Study 1, each individual area showed significant changes across treatment weeks. Art, block and drama all demonstrated significant decreases from baseline when the computer was introduced in Week 2. Art and block returned to baseline levels by Week 3; however, drama never returned to baseline level. The manipulative toy area experienced a significant increase when the computer was introduced but returned to baseline level by Week 3.

As expected, the media area also had a significant increase when the computer was inserted during Week 2 — from 2% in baseline to 23% in Week 2. However, in Week 3, the media area dropped back to 10%, not significantly different from baseline. During Week 4, the media area again showed a significant increase to 24% equivalent to Week 2.

During Week 2, although technically the computer was not interactive, some children perceived it as being interactive and others pretended it was interactive — the children typed and action occurred. But in Week 3, when the software was indeed interactive, it was quite disappointing to the children when compared to the constant action of Week 2 — there was no action on the screen until someone "worked" the software properly and even then, there was a "delay" (a few seconds) between hitting the key and the software response. The children appeared frustrated and quickly left the computer area. There were times during Week 3 when no one was at the computer (this did not happen during Week 2 nor Week 4). Because of this "misperception" about the interactiveness of the computer, this phase was omitted from the second study.

In the second study, drama, quiet and art all decreased when the computer was introduced in Week 2. By Week 3, drama and quiet regained their baseline levels but art continued to decrease to a level significantly below baseline. The book and concept areas showed no significant changes from baseline through the computer phases.

The computer area increased significantly from baseline (<1%) to Week 2 (17%) and then significantly decreased in Week 3 to 11%. However, Week 3 was still significantly higher than baseline.

When the computer was first introduced during Week 2, and the observer at the computer did not interact with the children, there were literally "crowds" of children pushing and shoving to get to the computer. This behavior may have discouraged some children from coming to the computer and accounted for the decline in Week 3.

Overall, the results suggest that the computer initially disrupts other free-play areas in the preschool classroom, but that in general, children return to baseline levels over time. Only one play area in each study did not return to baseline levels: drama in Study 1 and art in Study 2.

Sex

In Study 1, a significant main effect for sex was found: girls spent significantly more time at the computer than boys. The girls averaged 21% of their time at the computer compared to 11% for the boys (see Figure 3).

In Study 2, no significant effect for sex was present. These findings support the notion that at the preschool level, the computer is not a male-sex-typed activity.

Competence

No differences were found in either study for competence. High and medium competence children spent equal amounts of time at the computer. The high competence children did not "take over" the computer.

Discussion

There has been much concern about the introduction of microcomputers in the preschool setting, particularly that children will interact with the computer and lose interest in other important activities (Barnes & Hill, 1983). In general, the introduction of the microcomputer into the preschool classroom initially disrupted free-play time. Similar to the observations in children's museums (White, 1983; Wredge, 1982), given a choice of activities, the preschoolers in the present studies were extremely interested in this novel object in their environment, as they might be with any large, colorful novel object. However, within a week or two, free-play returned to "normal." That is, children again returned to selecting a variety of activities during free-play choice and were spending the same amounts of time in the different free-play areas as they were before the computer arrived. In each classroom, there was one free-play area which did not fully regain its baseline level; the authors speculate that the area which loses to the computer may be a function of the individual classroom and/or the particular group of children in the room.

A major concern with regard to computers in our society is the sex-typing which occurs. The computer has been male sex-typed in elementary and secondary schools (Anderson et al., 1984; Jewson et al., 1982; Lockheed & Frakt, 1984; Sanders, 1984); at computer camps (Miura & Hess, 1984; Sanders, 1984; Schubert & Bakke, 1984); among parents, who demonstrate a bias towards male children in terms of computer

purchase and training (Gilliland, 1984; Schubert & Bakke, 1984); and in computer software itself (Fisher, 1984; Sanders, 1984). The microcomputer was found to be a fairly egalitarian play object in these studies. If indeed the microcomputer has not been sex-typed at the preschool level, it behooves educators to consider introducing the computer to preschoolers before the computer acquires this "male-only" sex typing.

And finally, with regard to competence, one should note that although certain children spent more time at the computer than other children, there was not a significant relationship between competence and computer time. That is, the "high competence" children did not monopolize the computer and exclude the "moderate competence" children. It should also be noted that none of the children fell into a "low competence" grouping; findings might be different in a setting with both "high" and "low" competence children.

References

Anderson, R. E., Welch, W. W., & Harris, L. J. (1984). Inequities in opportunities for computer literacy. The Computing Teacher, 11, 10-12.

Anderson, S., & Messick, S. (1974). Social competence in young children. Developmental Psychology, 10, 282-293.

Barnes, B. J., & Hill, S. (1983). Should young children work with microcomputer — logo before lego? The Computing Teacher, 10, 10-14.

Baumrind, D. (1973). The development of instrumental competence through socialization. In A. D. Dick [Ed.], Minnesota Symposium on Child Development (Vol. 7). Minneapolis: University of Minnesota Press.

Borgh, K., & Dickson, P. (1983). Two preschoolers sharing one microcomputer: How they handle it. On Wisconsin Computing, 1, 6-9.

Church, M., & Wright, J. (1983, March). Microcomputers as a creative part of the preschool curriculum: A computer discovery center project report. Paper presented at The Thirteenth Annual Early Childhood Conference, College Park, Maryland.

Emmerich, W. (1977). Structure and development of personal-social behaviors in economically disadvantaged preschool children. Genetic Psychology Monographs, 95, 191-245.

Fisher, G. (1984). Access to computers. The Computing Teacher, 11, 24-27.

Gilliland, K. (1984). EQUALS in computer technology. The Computing Teacher, 11, 42-44.

Jewson, J., Sheingold, K., Gearhardt, M., & Berger, C. (1982,May). Microcomputers in schools: Impact on the social life of elementary classrooms. Unpublished manuscript, Center for Children and Technology, Bank Street College of Education, New York.

Lockheed, M. E., & Frakt, S. B. (1984). Sex equity: Increasing girls' use of computers. The Computing Teacher, 11, 16-18.

Miura, I. T., & Hess, R. D. (1984). Enrollment differences in computer camps and summer classes. The Computing Teacher, 11, 22.

O'Leary, V. E. (1977). Towards understanding women. Monterey, California: Brooks and Cole Publishing Company.

Reed, S. (1983). Practicing what you teach: An interview with Professor Pat Dixon. Family Computing, 1, 60-63.

Sanders, J. S. (1984). The computer: Male, female or androgynous. The Computing Teacher, 11, 31-34.

Schaefer, E. S. (1971). Development of hierarchical configural models for parent behavior and child behavior. In J. P. Hall [Ed.], Minnesota Symposia on Child Psychology (Vol. 5). Minneapolis: University of Minnesota Press.

Schaefer, E. S., Edgerton, M., & Aaronson, M. (1978). Inter-item reliabilities of scales in The Classroom Behavior Inventory Manual. Unpublished manuscript, University of North Carolina.

Schubert, J. G., & Bakke, T. W. (1984). Practical solutions to overcoming equity in computer use. The Computing Teacher, 11, 28-30.

Sheingold, K. (1981, February). Issues related to the implementation of computer technology in schools: A cross-section study. Paper presented at The National Institute Related to the Implementation of Computer Technology in Schools, Washington, D. C.

Sheingold, K. (1983, March). Issues related to the implementation of computer technology in the education of young children. Paper presented at The Thirteenth Annual Early Childhood Conference, College Park, Maryland.

White, B. (1972). Pre-school Project: Child rearing practices and the development of competence. Final report, Lab of Human Development, Harvard University, Cambridge, Mass.

White, M. A. (1983). Synthesis of research on electronic learning. Educational Leadership, 40, 13-15.

Wredge, R. (1982). Hands on! Popular Computing, 1, 110-123.

Table 1

Repeated Measures Analysis of Percent of Time for

Play Areas (6) by Treatment Weeks (4)

for Study 1

Source	SS	df	MS	F
Subjects	.00	10	.00	
Weeks	.00	3	.00	0.00
Week*Subjects	.00	30	.00	
Area	14517.97	5	2903.59	10.19 *
Area*Subjects	14249.75	50	284.99	
Week*Area	7368.77	15	491.25	9.35 *
Week*Area*Subjects	7884.77	150	52.57	
Total	44021.26	263		

*p = .0001

Table 2

Repeated Measures Analysis of Percent of Time for

Play Areas (6) by Treatment Weeks (3)

for Study 2

Source	SS	df	MS	F
Subjects	.00	19	.00	
Weeks	.00	2	.00	0.00
Week*Subjects	.00	38	.00	
Area	19611.57	5	3922.31	12.86 *
Area*Subjects	28970.15	95	304.95	
Week*Area	6434.09	10	643.41	6.06 *
Week*Area*Subjects	20181.06	190	106.22	
Total	75196.88	359		

*p = .0001

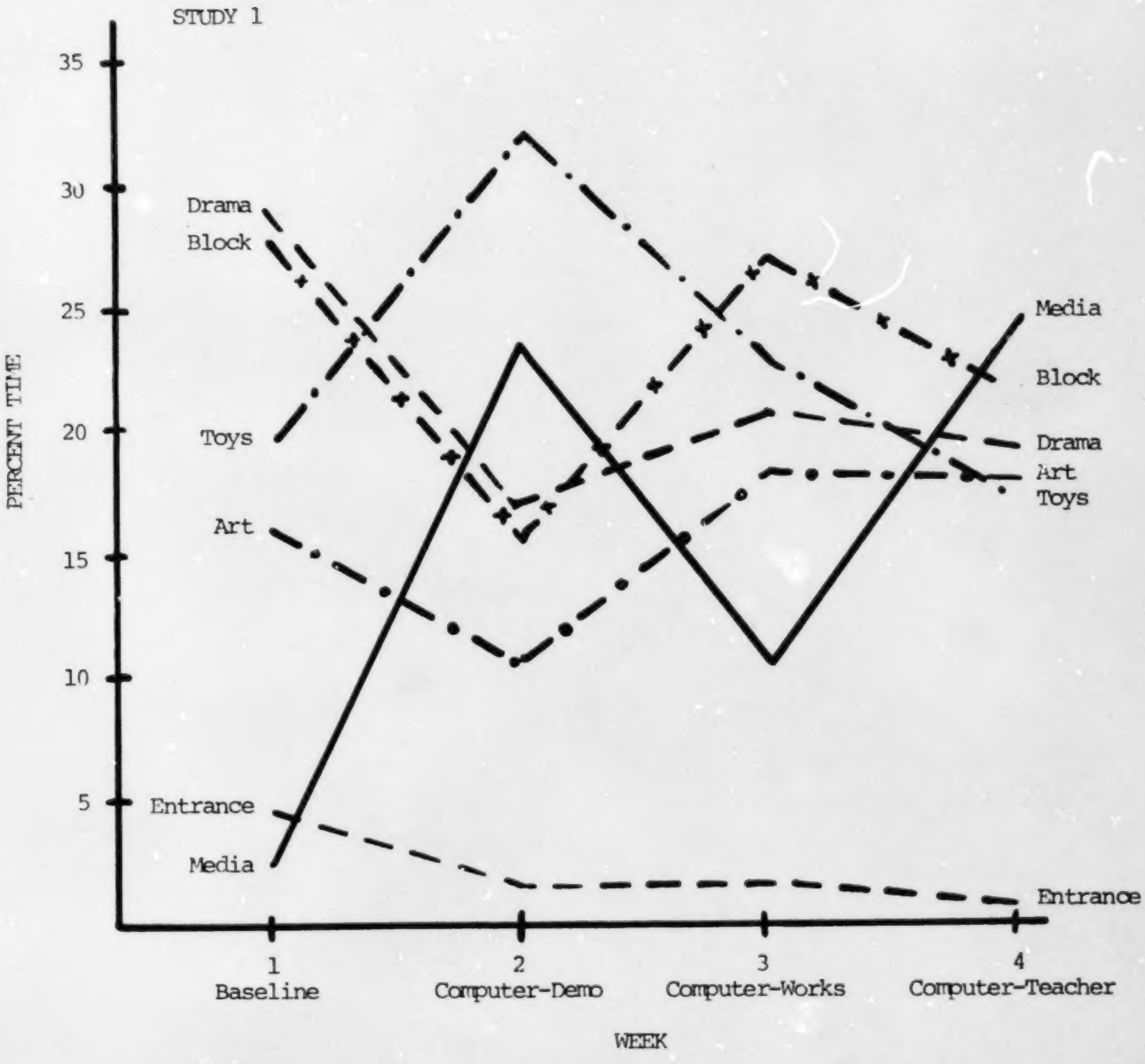

Figure 1. Percent of Time Spent in Each Free-Play Choice Area Across Treatment Weeks in Study 1.

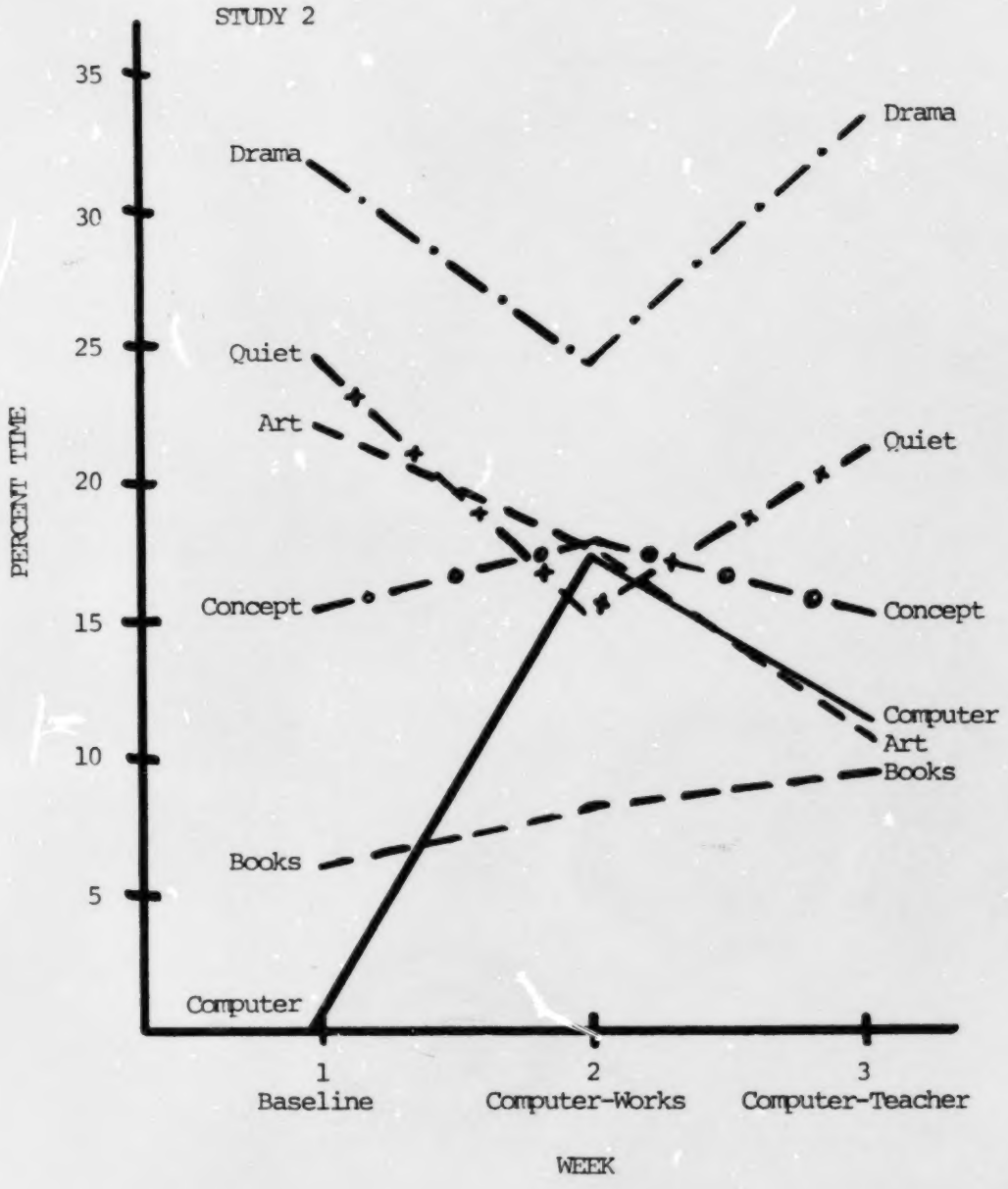

Figure 2. Percent of Time Spent in Each Free-Play Choice Area Across Treatment Weeks in Study 2.

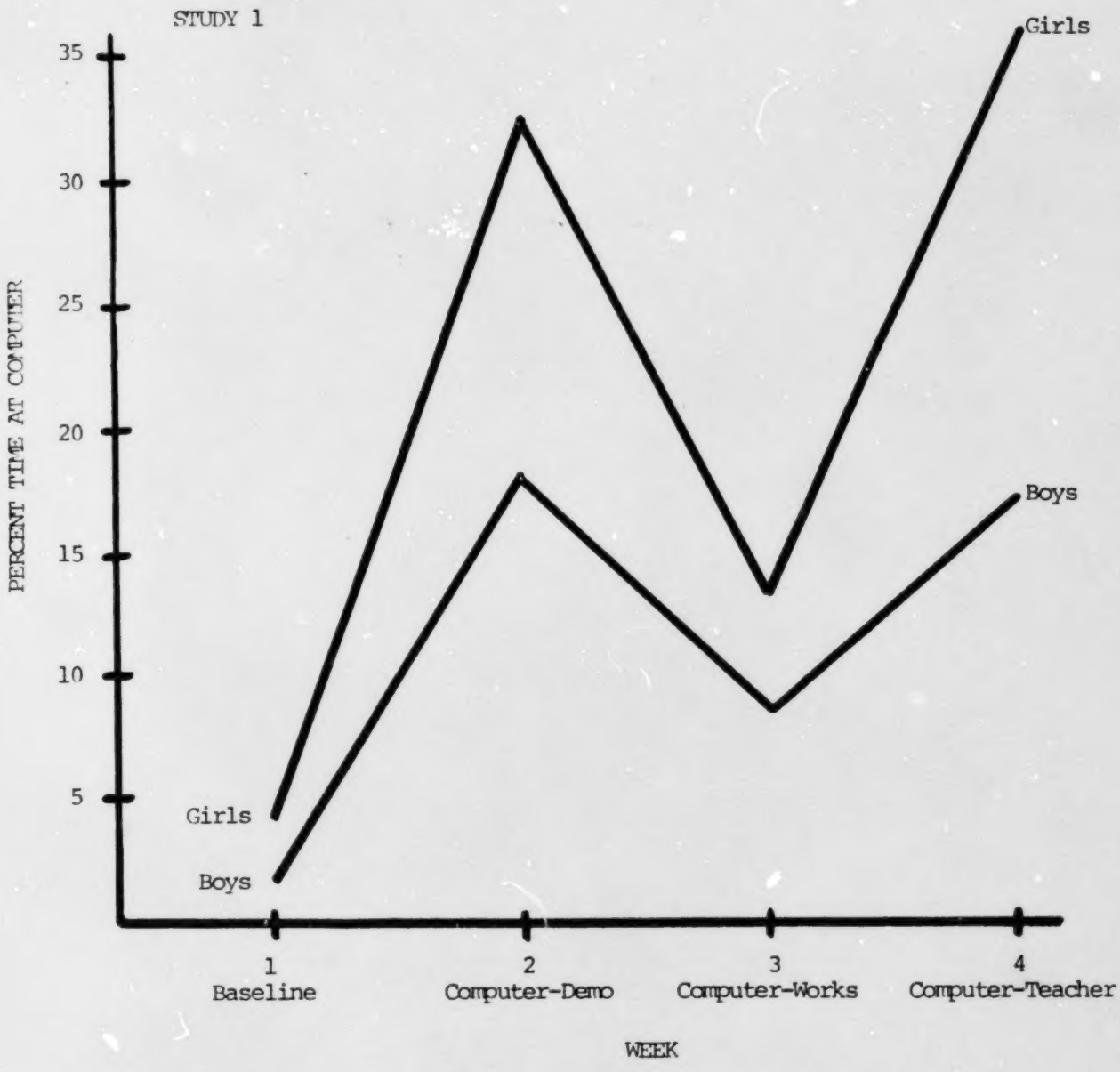

Figure 3. Percent of Time Spent at the Computer for Boys and Girls in Study 1.